REPUBLIC OF KENYA

MINISTRY OF AGRICULTURE AND IRRIGATION

National Strategy and Action Plan on Animal Genetic Resources for Kenya

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Foreword

Kenya is a signatory and commits herself to the Interlaken declaration. Consequently, the National Strategy and Action Plan (NSAP) on management of Animal Genetic Resources (AnGR) was developed in order to actualize and customize the outputs of The International Technical Conference. This strategy guides the development of the AnGR as part of implementation of the four GPA strategic areas, namely: Characterization, inventory and monitoring of trends and associated risks; Sustainable use and development; Conservation; and Policies, Institutions and Capacity Building.

The planned development and sustainable utilization of AnGR will optimize the economic benefits realizable from these AnGR while taking cognizance of those breeds and species that may be at risk for conservation. The strategy will endeavor to establish and strengthen relevant institutions that support the development of locally adapted AnGR and establish the necessary legal framework for the sustainable use for posterity.

The strategy further puts in place mechanisms for equitable benefit sharing of proceeds from utilization of AnGR, particularly in recognition of the local communities for their valuable contribution in development and conservation of locally adapted AnGR over several decades. The NSAP will empower the local communities to have a say and benefit from all people wishing to use the AnGR for any commercial purpose.

It is my hope that this strategy will bring sanity and direction in the development of the livestock sector in the country. I therefore, call upon all relevant stakeholders and development partners to participate in actualization of the key strategic actions and tasks planned herein for the benefit of Kenyan people.

Dr. Andrew Tuimur, CBS
Chief Administrative Secretary /Principal Secretary

Acknowledgement

We express our gratitude on behalf of the Ministry of Agriculture and Irrigation to FAO for leading the process and providing the guidelines that have been used to prepare the National Strategy and Action Plan for the Management of Animal Genetic Resources.

The core of the information for the preparation of this document was provided by the members of the National Advisory Committee on Management of AnGR who were drawn from stakeholders involved in addressing key issues germane to animal resource development in Kenya. We therefore recognize the efforts of these experts and to all those individuals in the country who contributed to the preparation of this strategy.

The preparation of this document could not have been accomplished without the financial support of the Regional Livelihood Resilience Project – A World Bank supported project - which funded critical phases during the development of this strategy. The AU-IBAR supported the National Consultative Forum and finalization of the Strategy. The Ministry appreciates their contribution and looks forward to further engaging partners in developing the livestock industry.

Last - but not least - the Ministry of Agriculture and Irrigation wishes to thank all the stakeholders who participated in the Regional and National Stakeholder Consultative Forums for their contributions which have enriched and enhanced the content of this strategy.

Executive summary

The livestock sub-sector directly accounts for about 12% of the country's GDP and about 42% of the agricultural GDP. The sub-sector substantially provides both direct (e.g., milk, meat) and collateral (e.g., dowry, insurance against economic bottlenecks) products while accounting for 30% of the total marketed agricultural products. The demand for livestock products is increasing more rapidly than supply in Kenya, and therefore, in the coming decade there is every reason to expect a widening gap between supply and demand for these products. Therefore, a wide portfolio of animal genetic resources is crucial to adapting and developing our livestock production systems. Climate change underlines the need to retain this adaptive capacity.

Livestock production makes a vital contribution to food and livelihood security, and to meeting the United Nations Sustainable Development Goals. However, it is more worrying that unrecorded genetic resources are being lost before their characteristics can be studied and their potential evaluated. Notable threats to livestock production in Kenya include influx of exotic genotypes due to market demands, unfavorable policies and legal frameworks to guide sustainable utilization of animal genetic resources, major disease epidemics and disasters of various kinds (droughts). These challenges and threats, if not addressed, could make the country heavily reliant on imported livestock products with consequences on farmers' and pastoralists' livelihoods.

Strenuous efforts to understand, prioritize and protect the animal genetic resources in Kenya for food and agriculture are required. Sustainable patterns of utilization must be established. Traditional livestock keepers – often resource limited and in marginal environments – have been the stewards of much of our animal genetic diversity over the years. We should not ignore their role or neglect their needs. Equitable arrangements for benefit-sharing are needed, and broad access to genetic resources must be ensured.

Over the years, development of the livestock sub-sector has been guided by different plans, strategies and policies. The Poverty Reduction Strategy Paper (PRSP) (2000); Economic Recovery Strategy for Wealth and Employment Creation (2003); Strategy for Revitalizing Agriculture (2004); National Livestock Policy (2008); Agricultural Sector Development Strategy (2010); Kenya's Vision 2030 Economic Blue Print; National Policy on Protection of Genetic Resources, Traditional Knowledge and Cultural Expressions; Comprehensive Africa Agriculture Development Programme (CAADP); and Global Plan of Action for Animal Genetic Resources are key to the development of livestock sub-sector.

However, majority of these strategic documents, lack depth in addressing sustainable utilization and conservation programs for animal genetic resources in Kenya. Consequently, a need to prepare National Strategy and Action Plan on management of animal genetic resources became crucial.

This national strategy and action plan has been prepared to guide the sustainable management of Kenya's animal genetic resources and is aligned to the Global Plan of Action. It addresses four key pillars for management of animal genetic resources – (i) Characterization, inventory and monitoring of trends and associated risks, (ii) Sustainable use and development, (iii) Conservation and, (iv) Institutions and capacity building. The national strategy and action plan adheres to relevant provisions of the regional economic communities and, embraces international standards in animals and animal products, while preserving biodiversity.

In preparing the Kenya National Strategy and Action Plans National Strategy and Action Plans, The Ministry of Agriculture and Irrigation, identified appropriate institutions responsible for animal genetic resources to oversee the process. These were; the National Focal Point, Technical Working Committee and the National Advisory Committee on Management of animal genetic resources. A taskforce prepared a draft National Strategy and Action Plan which was widely shared with stakeholders for consultations, reviews, adoption and ratification.

The Cabinet Secretary responsible for animal genetic resources will take overall responsibility for implementing the National Strategy and Action Plan. The National Advisory Committee will continue to provide overall technical supervision during the implementation phase. The National Focal Point will provide facilitation and coordination role during the implementation of the National Strategy and Action Plan.

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Acronyms

ADC	Agricultural Development Cooperation
AnGR	Animal Genetic resources
AU-IBAR	African Union-Inter- African Bureau on Animal Resources
CBO	Community Based Organization
CUE	Commission on University Education
DAD-IS	Domestic Animal Diversity Information System
DAGRIS	Domestic Animal Genetic Resources Information System
DRSRS	Department of Resource Survey and Remote Sensing
DLP	Directorate of Livestock Production
DVS	Directorate of Veterinary Services
EAAPP	Eastern African Agricultural Productivity Project
EBV	Estimated Breeding Values
FAO	Food and Agriculture Organization
GeRRI	Genetic Resources Research Institute
GPA	Global Plan of Action for AnGR
ILRI	International Livestock Research Institute
KALRO	Kenya Agricultural & Livestock Research Organization
KIPI	Kenya Intellectual Property Institute
KLBA	Kenya Livestock Breeders Association
KNBS	Kenya National Bureau of Statistics
MEANR	Ministry of Environment and Natural Resources
MA&I	Ministry of Agriculture and Irrigation
MOLD	Ministry of Livestock Development
NAC-AnGR	National Advisory Committee on Animal Genetic Resources
NACOSTI	National Council of Science, Technology and Innovations
NEMA	National Environmental Management Authority
NFP	National Focal Point
NGOs	Non Governmental Organizations
NRF	National Research Fund
REC	Regional Economic Community

Sahiwal cattle genetic resources provide both meat and milk for the Kenyan people

1. Introduction

Kenya is endowed with a rich diversity of animal genetic resources (AnGR) which are of great economic, social and cultural importance. These resources are exploited in diverse climatic conditions namely; desert, arid, semi-arid, sub-Humid, humid, and Afro-Alpine environments, and production systems that range from low input extensive to high input intensive systems. The country mainly uses ten species of AnGR for food and agriculture that include cattle, sheep, goats, camels, poultry, pigs, rabbits, horses, donkeys and bees. Each of these species is broadly classified as indigenous, exotic and crossbreds. The indigenous AnGR are adapted to a variety of production environments under low input production systems while the exotics have been developed for increased production per unit under high input production systems. Considerable diversity also exists within species and breeds or types. Indigenous livestock represent over 75% of the population of each respective species except for pigs and rabbits which are entirely exotic (MOALF, 2016).

According to the livestock sector report 2016, Kenya's livestock resource base is mainly comprised of cattle (20.5 million), goats (26.7 million), sheep (18.9 million), Camels (3.2million), Chicken (43.8 million), donkeys (2 million), pigs (0.5 million), Rabbits (0.8 million) and emerging livestock like ostrich, crocodile, quail (MOALF, 2016).

Most of the indigenous breeds are either at risk of extinction or are undergoing steady and continuous genetic dilution, despite their importance. Driven by the need for increased productivity livestock improvement programmes by government, non-governmental organizations, development partners and private sector have tended to favour the use of exotic breeds in crossbreeding, upgrading, and/or replacement of indigenous genotypes. Additionally, the livestock sub-sector encounters persistent challenges such as low productivity of local breeds, inadequate quality pastures during the dry season, diseases and poor access to profitable markets. The sector is also faced by threats that include; influx of exotic genotypes due to market demands, and less adapted livestock breeds, unfavorable policies and legal frameworks to guide sustainable utilization of AnGR, major disease epidemics and disasters of various kinds (e.g., droughts and floods). These challenges and threats, if not addressed, could make the country heavily reliant on imported livestock products with consequences on livelihoods of farmers and pastoralists. This, therefore, makes it crucial to address the livestock sector more coherently through development of a robust National Strategy and Action Plan for sustainable use and conservation of AnGR.

2. Background Information

Domestic animals, directly and indirectly, account for 30 to 40% of the total value of global food and agricultural production (FAO, 2014). They are an important component of food security and human livelihood in the provision of both tangible (milk, meat, eggs, manure, hides and skins) and intangible (insurance against economic bottlenecks, risk aversion, prestige, dowry, and cultural values) benefits (Liljestrand, 2012).

In Kenya, domestic farm animals are an important source of high quality protein, minerals, vitamins and micronutrients. The value of dietary animal protein cannot be overstated because it contains essential amino acids that are deficient in cereals. Local communities owe fundamental aspects of their social and cultural identity (e.g. marriage, religious practices) to specific types of livestock.

The livestock sub-sector contributes approximately 30% of the farm gate value of agricultural commodities, about 13% of the national Gross Domestic Product (GDP), and at least 50% of the agricultural GDP (Behnke and Muthami, 2011). Livestock also supply the local requirements of meat, milk, dairy products and other livestock products as well as draught power necessary for food production and other non-agricultural activities like sporting - although this tends to be overlooked and not valued in monetary terms. The draught animals used for power include donkeys, cattle, ostrich and camels. Special genetic qualities are needed to provide draught capability, and many breeds have been selected over time specifically for this purpose.

Dung from domestic animal provides fuel and manure. Biogas is widely used as a fuel for cooking and heating. Manure also serves as a source of fertilizer and soil conditioner, which are essential for a sustainable agricultural system.

Notable, however, supply and demand for livestock products and by-products are affected by increasing population, urbanization, policy environment and, the import/export markets among other factors (Delgado, 2005). This implies that, revitalization of the livestock industry with a focus on conservation and sustainable utilization of various AnGR, especially the indigenous AnGR is likely to yield a wide range of positive impacts throughout the country.

Indigenous knowledge has been used over millennia by communities to preserve livestock products like milk and meat. Presently, the knowledge is also used to add value to the products, leading to food security and increased income. For example, among the Somali communities of North Eastern Kenya, dried camel

meat (*Nyirnyir*) is a popular value added and preserved product. This increases the shelf-life of the meat for up to six months and the technique has become a popular value for exploitation of new markets for the product. Similarly, among the Luo community, preserved meat of cattle, sheep or goats (also known as *Aliya*) is a popular product. The Kalenjin community preserve milk (*Mursik*) by use of charcoal (soot) from indigenous tree species, which can last for up to one year. Such preservation technologies have withstood the test of time and are adding value to the products in modern times. These technologies, if harnessed and coupled with sustainable utilization of AnGR, are a sure bet of enhancing livelihoods of local communities.

Improved Kenyan Boran bull utilizing the rangelands

Kenya has a rich reservoir of AnGR with considerable diversity between and within species. These include cattle, sheep, goats, camels, donkeys, chicken, pigeons, ducks, geese, turkeys, ostrich, quails, rabbits, pigs, crocodiles, Guinea fowl and bees which are indigenous, exotic or their crosses. For example, a larger proportion of beef is produced from the short-horn Zebu, which represents the major genetic group of indigenous cattle in the country mainly under pastoral and extensive production systems. The short-horn Zebu is further divided into the large type comprising the Boran (Orma Boran, Kenya Boran and Northern Frontier District Boran), Turkana, Jiddu and Karapokot, and the small type comprising the Small East African Zebu (SEAZ) that includes the Nandi, Winam, Maasai and Kamba (FAO, 2014). Under ranching, beef is produced from beef breeds (Kenya Boran, Hereford, Charolais, Galloway and Aberdeen Angus); dual purpose breeds (Simmental, Red Poll, Brown Swiss, Sahiwal and Santa Getrudis) and a large group of crosses (DAGRIS, 2014). Meat is also obtained from culls from dairy enterprises.

The Kenyan dairy industry relies heavily on smallholder milk production, with over 1,000,000 smallholders that produce approximately 70% of the country's marketed milk (MoLD, 2012). The industry supports an estimated 500,000 service providers directly and over 750,000 indirectly, (MOALF 2016). Cattle Breeds used in the dairy industry in the country are mainly the Friesian, Guernsey, Jersey, Ayrshire, Sahiwal, Zebus and their crosses.

The small ruminants (i.e., sheep and goats) have the potential to adequately supply all the animal products and by-products to meet domestic needs and also generate surplus for export. There is a large population of fat and long tailed indigenous sheep and their crosses in the country.The indigenous goat breeds include the East African Goat and the Somali goat (Galla), while exotic goats include dairy (Toggenburg, Saanen, Alpine (German, British and French) and the Anglo Nubian), meat (Boer) and mohair (Angora) breeds. There is a large genetic group of cross-bred goatsin the country. Sheep population consists of Red Maasai, East African Fat-tailed, Blackhead Persian (Somali sheep) and the Dorper. Exotic sheep breeds are reared for mutton and wool in high rainfall areas. The Merino and Corriedale are kept for wool while the Hampshire Down and the Romney Marsh are kept for mutton. Notably, majority of the exotic sheep genotypes are on the decline in the country except for the Dorper.

The Red Maasai sheep are more resilient breed but is faced with a serious threat of extinction due to indiscriminate crossbreeding

Camels are traditionally reared in the northern dry areas of Kenya. However, partly due to changing climatic patterns they are being introduced into the southern rangelands. They are an important source of meat and milk in Arid and Semi-Arid environments. They are also used for transport, draught power, tourism and sporting activities. Camel is a more reliable milk producer than other species of livestock under arid conditions, with an average camel dam producing 4.5 kg of milk per day within 11 to 16 months lactation (Farah *et al,* 2004). There are three main genetic groups: indigenous represented by Somali, Rendille or Gabra and Turkana types; exotic types imported from Pakistan and crosses among them.

Somali camel are more hardy and widely distributed in north eastern parts of Kenya

Donkeys are mainly kept as draught and pack animals. However, some Kenyan communities use them for food (meat and milk). Production of donkeys for meat and skin is currently gaining popularity. All donkeys are indigenous and there are two main types; the Somali donkey common in northern Kenya and the Maasai donkey commonly found in many parts of southern Kenya.

Poultry production and in particular indigenous chicken play a significant role in the economic and social life of resource-poor households, contributing to a cheap source of animal proteins and cash income. Indigenous chicken whenever there are human settlements and their economic strength lies in their low cost of production. They are highly adapted to the harsh scavenging conditions, limited feed resources, diseases and parasite challenges. The indigenous chicken constitutes heterogeneous population with huge variability in morphological features. The chicken have not been classified into breeds, but are commonly named according to their morphological features. The main types kept include; normal-feather, frizzled, naked-neck, crested, among others (Ngeno et al 2014). On a commercial scale, exotic chicken breeds are a major source of poultry meat and eggs. These include broiler chicken of various crosses, hybrid layers, turkey, quails, ducks, ostrich, doves and guinea fowls.

Normal-feathered indigenous chicken kept for provision of both eggs and meat

All pigs in Kenya are exotic, imported mainly from Europe and Asia. Breeding of pigs was previously undertaken by research and commercial breeding institutions. Currently most of the pig production is carried out intensively by small scale farmers with less than twenty sows. Pig breeds include Large White, Landrace, Duroc, Hampshire, Saddleback and their crosses.

The population of rabbits has been increasing steadily in high and medium potential areas. Products from rabbits include; meat, urine, pelt, hair and manure. Rearing of rabbits is a low capital investment enterprise, which has contributed to its popularity among small scale farmers. The main genetic groups are Kenya White, New Zealand White, and Californian White, French Ear-lope, Chinchilla, Giant Flemish and their crosses. There is no documentation on the existence of indigenous rabbit genetic resources in the country.

Bees are mainly kept for honey, beeswax, propolis, royal jelly, brood, bee venom, and for crop pollination. There are two main bees' genetic groups in the country: *apis mellifera adansoni and apis mellifera scutellata.* These groups are further subdivided into two strains namely the stinging and stingless types.

The emerging livestock include; ostrich, crocodiles, quails, guinea fowls, guinea pigs, snakes and frogs. These are animals that over many years were regarded as wild and are now being reared for food, skins and feathers. Farmers intending to rear these animals in the country for food must comply with the Wildlife Act which provides for their regulation and protection.

Animal genetic diversity is exposed to number of threats. The most significant is the marginalization of pastoral production systems and the associated local breeds through biased policies. Policies and legal frameworks influencing the livestock sector are not always favorable to the sustainable utilization of AnGR. For example, government support has often promoted the development of intensive production systems that utilize a narrow range of exotic breeds at the expense of the pastoral systems based on local animal genetic resources. The intensification process has been driven by rising demand for animal products and has been facilitated by the ease with which genetic material, production technologies and inputs can be availed in Kenya.

Other threats such as major disease epidemics and disasters of various kinds (droughts, floods, etc.) are also a concern particularly in the case of small, geographically concentrated breed populations. In the event of disease outbreaks, mortality figures are rarely broken down by breed in Kenya. Nonetheless, it is clear that very large numbers of animals can be lost, and that it is often the culling measures imposed to control the epidemic that result in

the largest number of deaths. In the case of disasters and emergencies, the initial event may kill large numbers of animals, and there is a possibility that populations confined to affected areas could be wiped out. However, the outcome in terms of the genetic diversity will often be greatly influenced by the nature of post-emergency restocking programmes. Threats of this kind cannot be eliminated, but their impacts can be mitigated.

Development and post-disaster rehabilitation programmes that involve livestock should assess their potential impacts on genetic diversity and ensure that the breeds used are appropriate to local production environments and the needs of the intended beneficiaries. Preparedness is essential in this context, as *ad hoc* actions taken in an emergency situation will usually be far less effective. Fundamental to such plans, and more broadly to sustainable management, is improved knowledge of which breeds have characteristics that make them priorities for protection, and how they are distributed geographically and by production system in Kenya.

Clearly, it is neither possible nor desirable that the conservation of animal genetic resources should, in itself, take precedence over objectives such as food security and nutrition, humanitarian response to disasters, or control of serious animal diseases. However, it is likely that many measures with the potential to reduce the risk of genetic erosion will also promote efficient utilization of existing AnGR, and complement livestock development objectives in the Country.

Friesian-Sahiwal crossbreds are gaining popularity among the smallholder dairy farmers in Kenya

3. National Strategy

3.1 The process of preparing the Kenya National Strategy and Action Plans

In preparing the Kenya National Strategy and Action Plan, The Ministry of Agriculture, Livestock and Fisheries identified appropriate institutions responsible for AnGR to oversee the process. These were; the National Focal Point and the National Advisory Committee. Membership of the National Advisory Committee on Management of Animal Genetic Resources (NAC-AnGR) was constituted from state agencies, research organizations (local and international), farmer organisations, non-governmental organization, and Universities. The NAC-AnGR identified the preparation of the National Strategy and Action Plan as an important tool for efficient utilization of AnGR in Kenya. It therefore appointed a taskforce to prepare a draft National Strategy and Action Plan for review by NAC-AnGR before sharing with stakeholders for adoption and ratification.

The taskforce held meetings to review progress of the AnGR initiatives in the country. They visited various institutions where these activities were taking place. The taskforce identified the key strategic priorities in the Global Plan of Action (GPA) and prioritised the National Actions in line with the four strategic areas of the GPA. All members of the NAC-AnGR reviewed the draft document produced by the taskforce prior to its release for formal consultations. A stakeholder consultation plan was prepared as outlined below.

3.2 Stakeholders' participation and consultation process

Identification of the target stakeholders, individuals and organizations is crucial for effective consultations. Stakeholder groups involved in management of AnGR were involved in the National Strategy and Action Plans consultation process. These groups were identified from breed societies, state agencies, county governments, research institutions, education institutions, non-governmental organizations, amongst others.

The consultation methods such as Focus Group Discussion and Workshops were used to reach a wider audience. The workshops were conducted at regional levels to ensure inputs from various parts of the country. Two regional workshops and a national workshop were scheduled and conducted. The final draft document was shared with other experts such as FAO to ensure compliance.

3.3 Vision

A prosperous livestock sector founded on sustainable development and utilization of Animal Genetic Resources

3.4 Mission

To provide guidance on sustainable utilization and conservationof animal genetic resources for improved livelihoods.

3.5 Objectives

i) Promote the sustainable use and development of animal genetic resources for food and nutrition security, and enhanced livelihoods among livestock farmers.

ii) Enhance conservation of the locally adapted animal genetic resource diversity for present and future generations.

iii) Promote access and sharing of the benefits arising from the use of animal genetic resources; recognize the role of traditional knowledge, innovations and practices.

iv) Develop and strengthen policies, legal frameworks, national programmes and institutional capacity in the management of animal genetic resources.

Small East African goats 'browsing' in northern rangelands in Kenya

4. Strategic Priorities

4.1 Strategic Area 1: Characterization, inventory and monitoring oftrends and associated risks

4.1.1 Characterization of animal genetic resources

a) Review and collate characterization information
b) Conduct pilot studies to authenticate previous characterization information, and carry out phenotypic and genotypic characterization of the AnGR based on the outcome of the review process
c) Establish a national AnGR database
d) Update the national, regional and global databases for AnGRSeveral initiatives on phenotypic and genotypic characterization have been done in the country but the information is scattered in various documents. There is need to collate this information and identify gaps by species, breeds or ecotypes that have not been characterized. A standardized tool kit for phenotypic and genotypic characterization will be used. The key considerations before characterization include; the sampling frame and related procedures with a clearly outlined reporting format. The data will be managed through the established national and regional databases.

Priority actions

1. Review and collate characterization information
2. Conduct pilot studies to authenticate previous characterization information, and carry out phenotypic and genotypic characterization of the AnGR based on the outcome of the review process
3. Establish a national AnGR database
4. Update the national, regional and global databases for AnGR

4.1.2 Conduct inventories of the location and population status of animal genetic resources

Scanty data to inform development of a national AnGR inventory has limited adequate planning for the sustainable use of these resources in most African countries. This is mainly attributed to the lack of financial resources to support extensive collection of livestock data. Where such data exists, the quality is inadequate based on the completeness and accuracy. Several inventory and monitoring tools developed vary in cost, effectiveness and reach. Opportunities exist to undertake primary inventories through extension workers, farmer organizations and bottom-up from communities.

Priority action

1. Conduct regular livestock censuses and periodic surveys

4.1.3 Monitoring of trends and associated risk

A monitoring process is required to provide the necessary information for assessing the extent and source of risk to our locally adapted breeds. Monitoring of population sizes and trends for each breed including both national bio-geographical and global status are an integral part of this procedure. Currently no monitoring has been carried out, and therefore, the inability to identify breeds at risk.

Opportunities are available for use of integrated approaches for inventory and monitoring that involves systematic and accurate use of spatial, air and ground survey techniques - however they have not been utilized appropriately.

Priority actions

1. Compare breed populations and distribution over time
2. Identify breeds at risk
3. Enhance the use of integrated approaches for inventory and monitoring of AnGR.

4.1.4 Adapt agreement on a common set of minimum criteria and indicators for management of animal genetic resources

Adapt methods for characterization, breed evaluation, valuation, and comparison as well as interoperability protocols for livestock information systemsThe global plan of action identified the crucial value attached to animal genetic resources and the need to enumerate the sociocultural values attached to various species of livestock. Some of these AnGR, such as the Red Maasai sheep, which may be at risk of extinction, are also found in neighbouring countries. To be able to compare them, it would be important to use standardized tools developed for use in the region.

Priority action

1. Adapt methods for characterization, breed evaluation, valuation, and comparison as well as interoperability protocols for livestock information systems.

4.2 Strategic Area 2: Sustainable use and development

4.2.1 Animal identification

Unique identification of AnGR in a country is important for traceability, genetic improvement, monitoring progress in productivity and management. In Kenya, individual animal identification, in various forms, is practised by a few farmers, and most pastoral communities. The Kenya Stud Book in collaboration with breed societies has over time promoted individual animal identification for cattle, sheep, goats and pigs. However, the identification systems are not standardised across herds. These systems need to be harmonized and promoted through a centralized system. The system should have an indication of the species, breed, herd, locality and unique animal identifier.

Priority action

1. Develop a national animal identification system

4.2.2 Pedigree and performance recording

Strengthen and promote pedigree and performance recording system, and feedback mechanism Pedigree and performance recording of the locally adapted breeds has been minimal due to inadequate human capacity, necessary infrastructure and farmer awareness on the associated benefits. In addition, the existing mechanism for collection of pedigree and performance records is weak.

Priority action

1. Strengthen and promote pedigree and performance recording system, and feedback mechanism

4.2.3 Genetic evaluation

The main objective of genetic evaluation is provision of Estimated Breeding Values (EBVs) used in the selection of parents of the next generation. Genetic evaluations for all traits are aimed at identifying the best animals in each breed, compared to a reference group, which is considered as the breed average. For production traits, sire proofs and dam indexes are expressed as EBVs, reflecting the animal's genetic potential for the specific trait, of which half is transmitted to their progeny.

A comprehensive AnGR evaluation system is lacking in Kenya, and therefore, the genetic progression of this resource cannot be effectively monitored. This has been aggravated by poor recording and pedigree registration where, for example, about 0.3% of cattle in the country are registered and about 0.2% are performance recorded (KLBO, 2015). Developing the capacity of institutions involved in genetic evaluation while adapting and promoting use of digital performance recording, pedigree testing tools and essential feedback will upscale the number of animals involved in breed improvement in the country.

Priority action

1. Develop human capacity and strengthen infrastructure for genetic evaluation.

4.2.4 Review existing national policies on sustainable use to assess their impact on animal genetic resources management

Conduct an impact assessment study of the national policies on sustainable use and management of AnGR. There are various national policies that guide development of animal genetic resources. These policies have had various implications on the development of AnGR with varying effects on their management. The NAC-AnGR needs to assess the policies and provide for changes to ensure the policies enhance the development of the AnGR.

Priority action

1. Conduct an impact assessment study of the national policies on sustainable use and management of AnGR.

4.2.5 Develop long-term planning and strategic breeding programmes and consider a number of elements, including efforts to improve underutilized breeds

Initiate and develop breeding programmes for locally adapted breeds Strengthen existing national breeding programmes Low to medium input production systems are characterised by locally adapted breeds that are often underutilised. It has now been recognized that these breeds can be developed since they are able to utilize the fragile environments in which they are found and produce high quality products. However, there has been no breeding program to improve the utilization of these breeds.

Priority action

1. Initiate and develop breeding programmes for locally adapted breeds
2. Strengthen existing national breeding programmes

4.2.6. Develop approaches, including mechanisms, to support wide access to, and the fair and equitable sharing of, benefits arising from the use of animal genetic resources and associated traditional knowledge.

a) Support and guide development of community bio-cultural protocols tof acilitate access and benefits sharing.

b) Document indigenous knowledge on AnGR management by various communities
c) Develop a legal framework to support access and benefits sharing of AnGR Indigenous breeds are particularly suited to local conditions because of adaptation through natural selection, as well as our contribution to their genetic development through selective breeding.

The pastoral way of life promotes the conservation of the indigenous breeds of livestock according to their values that promote the sustainable use of livestock while ensuring conservation of the wider environment. There is need to involve the communities in decisions on research and breeding that affects their breeds and/or traditional knowledge. Research and breeding programs should be conducted at the appropriate community level, seek community consent, encourage community participation and determine the tangible benefits the community can receive from the programmes. An example is the Samburu Bio cultural protocol covering mainly the Red Maasai sheep.

Priority actions

1. Support and guide development of community bio-cultural protocols to facilitate access and benefits sharing.
2. Document indigenous knowledge on AnGR management by various communities
3. Develop a legal framework to support access and benefits sharing of AnGR

4.3 Strategic Area 3: Conservation

There are limited initiatives to conserve AnGR in Kenya with both *in situ* and *ex situ* conservation efforts limited by lack of appropriate infrastructure, human capacity, policy and legal framework. Deliberate efforts for infrastructural developments such as establishment of gene banks, capacity building, development of policy options and legal framework for conservation will help reduce the erosion and loss of AnGR particularly for those at risk.

4.3.1 Community-based conservation programmes

Livestock keepers have acquired traditional knowledge and experience relating to livestock over many years, which has contributed to the present diversity in animal genetic resources. The acquired traditional knowledge is vital in the development and implementation of Community based conservation programme. Such programmes will assist in conservation of locally adapted breeds especially in cattle, sheep, goats, poultry and camels.

Priority actions

1. Compare breed populations and distribution over time
2. Identify breeds at risk
3. Enhance the use of integrated approaches for inventory and monitoring of AnGR

4.3.2 Recognition/award programmes for breeders

Develop a recognition/award programme for livestock breeders to support conservation efforts. Pastoral communities have been custodians of locally adapted breeds for many years but have not been recognized for their conservation efforts. It is important to provide incentives to support conservation by local communities through recognition or rewarding programmes for breeders who have consistently conserved genetic material over time. Monetary or material support to breeders, better market prices and product promotion to increase uptake are some of the incentives to be considered.

Priority action

1. Develop a recognition/award programme for livestock breeders to support conservation efforts.

4.3.3 In situ conservation for animal genetic resources

In situ conservation has been driven by demand for consumption of animal products. However, minimal efforts have been made to develop *in situ* conservation priorities and goals to conserve AnGR at risk. There is need to assess the factors that lead to erosion of AnGR such as indiscriminate crossbreeding.

Priority action

1. Develop in situ conservation priorities and goals
2. Assess factors leading to the erosion of animal genetic resources and formulate appropriate strategies including policy responses

4.3.4 Establish or strengthen national facilities for ex situ conservation

Currently Kenya has capacity for cryopreservation of semen and embryos. This has concentrated mainly on bovine and caprine species. However, there is need to build capacity in cryopreservation to include other AnGRsuch as poultry, camel, porcine, bees and other emerging livestock. There is also need to build capacity in cryopreservation of other geneticbmaterials such as ova and stem cells by enhancing the current infrastructure and the accompanying data base.

Priority actions

1. Establish a gene bank for animal genetic resources
2. Strengthen AnGR conservation farms and stations
3. Develop ex situ conservation priorities and goals

4.4 Strategic Area 4: Policies, Institutions and Capacity Building

4.4.1 Education, Research and Training

The country has educational institutions offering some aspects of sustainable use and management of AnGR. However, there is low investment in research, limited personnel and skills, and lack of curriculum programs targeting sustainable utilization and conservation.

Development and inclusion of more comprehensive programs in conservation and utilization of AnGR into the curriculum is necessary. Kenya has embarked on institutional reforms that encourage focus on livestock research to enhance food security. Therefore, research and development of AnGR need to be prioritized and strengthened with the necessary budgetary provisions.

Priority actions

1. Initiate the review of national research priorities on AnGR
2. Undertake capacity needs assessment in AnGR management
3. Establish targets for training to build the national skills base to support efforts to characterize inventorize and monitor trends and associated risks, sustainable use, development and conservation of AnGR.

4.4.2 Knowledge, Awareness & Stakeholder participation

The socio-economic and political changes in Kenya have focused attention on information and knowledge as critical levers for the needed transformative growth and development in the livestock sub sector. Over the years, governments and development partners' initiatives have aimed at utilization of high producing breeds with little regard to the locally adapted ones. As a result, we have lost some of our local adapted breeds with their desirable characteristics. There is need for more awareness creation and stakeholder participation in the sustainable utilization and conservation of AnGR.

Priority actions

1. Establish networks of stakeholders for information and knowledge sharing for sustainable use, development and conservation of AnGR.
2. Raise awareness of the roles and values of locally adapted breeds for sustainable use and conservation.

4.4.3 Policy and legal framework

Livestock industry has been driven by various legal instruments. These include livestock policy (Revised 2008), ADC CAP 444 (Revised 2012), National policy on traditional knowledge, genetic resources, and cultural expressions (2009). The government has established various centres and institutions to undertake conservation of AnGR. Kenya Animal Genetic Resources Cenre (legal notice No. 110 of 2011), Genetic Resources Research Institute (GeRRI) (KALR Act No. 17 of 2013), multiplication centres, Agricultural Development Corporation (ADC CAP 444) are mandated to undertake conservation of AnGR. However, these institutions are faced with inadequate capacity and investment to undertake their mandates. Further, their roles and functions are not well coordinated.

Priority actions

1. Enhance capacity and investment in the conservation centres and institutions
2. Review and harmonize existing policies and legal frameworks and where there are gaps, develop guidelines for efficient coordination in management of AnGR

4.4.4 Strengthen the National Focal Point

The Global Plan of Action (GPA) on Management of AnGR advocates for the establishment of National Focal Point (NFP) for coordination purposes. In Kenya, the NFP is housed at the Ministry of Agriculture, Livestock and Fisheries. However, the focal point lacks requisite human capacity, infrastructure and budgetary provision to support effective coordination activities. This has led to ineffective coordination of AnGR management nitiatives.

Priority actions

1. Develop mechanisms for efficient and effective national coordination among stakeholders and actors involved in management of AnGR.
2. Provide appropriate human capacity and budgetary allocations to NFP.

Rabbits are very popular in backyard production system

5. Action Plan

5.1 Introduction to the action plan

The National Strategy and Action Plan gives guidance on the managementsustainable use and conservation of animal genetic resources. Unfavourable policies and legal frameworks, introduction of exotics, major disease epidemics and natural disasters such as drought and floods has led to a systematic erosion or complete loss of AnGR. The continuation of this trend may lead to complete loss of indigenous AnGR that have resilience to adverse effects of climate change. This action plan gives a framework for implementation of the national strategies.

5.2 Strategic priorities and action plan

Strategic priorities and actions status are presented in Table

Table 1: Strategic priorities and actions

Strategic priority areas in the Global Plan of Action	National strategic priorities	National priority actions
Characterization, inventory and monitoring of trends and associated risks	1. Characterization of AnGR	i). Review and collate characterization information
		ii). Undertake pilot studies to authenticate previous characterization information
		iii). Characterize (Phenotypic and genotypic) AnGR based on the outcome of the review process
		iv). Establish and update national AnGR database
	2. Inventorizing the location and population status of AnGR	i). Conduct regular livestock census and periodic surveys
	3. Monitoring of trends and associated risk	i).Compare breed populations and distribution over time
		ii).Identify breeds at risk
	4. Adapting agreements on a common set of minimum criteria and indicators for management of AnGR	i). Adapt methods for characterization, breed evaluation, valuation and comparison
		ii). Adapt interoperability protocols for information systems
Sustainable use and development	5. Animal identification	i). Develop a national animal identification system

Strategic priority areas in the Global Plan of Action	National strategic priorities	National priority actions
	6. Pedigree and performance recording	i). Strengthen and promote pedigree and performance recording system and feedback mechanism
	7. Genetic evaluation	i). Develop human capacity for genetic evaluation ii). Strengthen infrastructure for genetic evaluation
	8. Review existing national policies on sustainable use to assess their impacts on AnGR management	i). Conduct an impact assessment study of the national policies on sustainable use and management of AnGR
	9. Developing long-term planning and strategic breeding programmes including efforts to improve underutilized breeds	ii). Develop and initiate breeding programmes for locally adapted breeds
	10. Developing approaches to support wide access to, and benefits sharing arising from the use of animal genetic resources and associated traditional knowledge	i). Support and guide development of communitybio-cultural protocols to facilitate access and benefits sharing ii). Develop a legal framework to support access and benefits sharing of AnGR iii).Document indigenous knowledge on AnGR management by various communities
Conservation	11. Community-based conservation programmes	i). Developand promote community based conservation programmes
	12. Recognition/award programmes for breeders	i). Develop recognition/award programmes for livestock breeders to support conservation efforts
	13. *In situ* conservation for animal genetic resources	i). Develop *in situ* conservation priorities and goals
		ii). Assess factors leading to the erosion of animal genetic resources and formulate strategies appropriate includingpolicy responses
	14. Establishing or strengthening national facilities for *ex situ* conservation	i). Establish a gene bank for AnGR ii). Develop *ex situ* conservation priorities and goals iii). Strengthen institutions and facilities for ex situ conservation iv) Identify genetic materials for backup and location

Strategic priority areas in the Global Plan of Action	National strategic priorities	National priority actions
	15.Develop approaches and technical standards for conservation	1.Adapt standardized methods and guidelines for use in conservation of AnGR
Policies, institutions and capacity building	16. Education, Research and training	i) Initiate review of national research priorities in AnGR ii) undertake capacity needs assessment in AnGR management iii). Establish targets for training to build the national skills base in management of AnGR
	17. Knowledge, awareness and stakeholder participation	i) Establish networks of researchers, breeders and conservation organizations including breed societies, relevant government agencies and other relevant stakeholders for information and knowledge sharing for sustainable use, development and conservation of AnGR.
	18. Policy and legal framework development and implementation	i). Review and harmonize existing policies, legal frameworks and where there are gaps, develop guidelinesfor the efficient coordination in management of AnGR ii). Develop a livestock Act and finalize livestock breeding policy and Act. iii). Review and ensure consistency of national law and policies concerning animal genetic resources with relevant International agreements, as appropriate
	19. Strengthen the National Focal Point (NFP) of animal genetic resources	i).Develop mechanisms for efficient and effective national coordination among stakeholders and actors involved in management of AnGR. ii). Provide appropriate human capacity and budgetary allocations to NFP. iii). Promote regional collaboration in the management of AnGR
Resource Mobilization	20. Strengthen efforts to mobilize resources, including Financial resources, for the conservation, sustainable use and development of animal genetic resources	i).Assist various stakeholders to strengthen capacity-building, through exchange of experience, enhancing research and educational activities, providing training opportunities, technology transfer and financial resources.

Strategic priority areas in the Global Plan of Action	National strategic priorities	National priority actions
		ii). Develop a follow-up process to implement the National Plan of Action for Animal Genetic Resources. iii). Strengthen cooperation and coordination of conservation, sustainable use and development of animal genetic resources at the national level including through ex situ backup systems for the protection against the risk of emergency or disaster scenarios.

5.3 Implementation of the National Strategy and Action Plans

The Cabinet Secretary responsible for animal genetic resources will take overall responsibility for implementing the National Strategy and Action Plans. The National Advisory Committee will continue to provide overall technical supervision during the implementation phase. The National Focal Point will provide facilitation and coordination role during the implementation of the National Strategy and Action Plans.The main activities for the National Focal Point will be:

1. Preparation of an annual workplan and budget for the national programme with special emphasis on the implementation of the National Strategy and Action Plans;
2. Facilitating and coordinating activities of the national animal genetic resources network;
3. Preparing project proposals and mobilizing financial resources from both national and international sources;
4. Managing data and information, including overseeing the development of a national database and contributing to regional and global databases for animal genetic resources;
5. Establish an animal genetic resources monitoring programme and an early warning system for breeds at risk;
6. Coordination of breed conservation programmes and ex situ gene banks for animal genetic resources;
7. Preparing communication materials and undertaking education and public awareness programmes;

8. Identifying opportunities for cooperation among countries and international agencies with common interests involving animal
9. genetic resources;
10. Facilitating evaluation of progress made in the implementation of the National Strategy and Action Plans, including developing appropriate performance indicators or measures to assess progress;
11. Maintaining linkages with, and contributing to the work of the FAO Global Focal Point.

The lead agencies and partners will play critical roles in the implementation of the various action plans as presented in Table 2.

Table 2: Indicative budget for implementation matrix

Strategic Priorities	Actions	Lead Implementing organization	Partner organizations	Time frame	Expected costs (KES)	Source of financing	Expected outputs
I. Characterization, inventory and monitoring of trends and associated risks							
1. Characterization of all AnGR	Review and collate characterization information and address the gaps	KALRO	ILRI Ministry responsible for livestock matters Universities County governments	18 Months	9M	Ministry responsible for livestock matters County Governments KALRO AU-IBAR Development partners	Status reports Policy briefs
	Characterization (Phenotypic and genotypic) of AnGR based on the outcome of the review process	KALRO	ILRI Ministry responsible for livestock matters AU-IBAR Universities KLBO/ Breed societies KWS National Museum of Kenya County Governments	3 Years	60M	Ministry responsible for livestock matters KALRO AU-IBAR Development partners County Governments	Breeds and ecotypes description reports Policy briefs
	Establish and update a national and contribute to the regional AnGR database	Ministry responsible for livestock matters	ILRI AU-IBAR KALRO Universities KLBO/ Breed societies KNBS County Governments	2 years	30M	Ministry responsible for livestock matters KNBS AU-IBAR Development partners County Governments	National AnGR database Updated DAD-IS AnGR database
2. Inventorization of the location and population status of AnGR.	Conduct livestock census	Ministry responsible for livestock matters	KNBS KALRO DRSRS County Governments	4 months	4B	Ministry responsible for livestock matters Development partners County Governments	Livestock census report Policy briefs

3. Monitoring of trends and associated risk	Periodic surveys, Compare breed/species populations and distribution over time	Ministry responsible for livestock matters	ILRI KALRO AU-IBAR Breed organizations Breed societies County governments Universities KNBS	Every 5 years	10M	Ministry responsible for livestock matters County Governments Development partners AU-IBAR	Survey Reports on breeds distribution and trends Policy briefs
4. Adapting agreements on a common set of minimum criteria and indicators for management of AnGR.	Develop and harmonize methods for characterization, evaluation, valuation and comparison of trans-boundary AnGR.	National Focal Point	Ministry responsible for livestock matters KALRO ILRI Universities NGOs EAC Breed societies	6 Months	2M	Ministry responsible for livestock matters KALRO Development partners AU-IBAR	Standardized working tools and techniques
	Adapt interoperability protocols for information systems	National Focal Point	Ministry responsible for livestock matters KALRO ILRI AU-IBAR Universities EAC	6 months			
II. Sustainable use and development							
5. Animal identification	Develop and pilot a national animal identification system	Ministry responsible for livestock matters	Breed organizations Universities KALRO Farmers County governments	5 years (Phase 1 - 10 Counties)	150 M	Ministry responsible for livestock matters Development Partners County governments Universities	A national animal identification system established Policy briefs
6. Pedigree and performance recording	1.Strengthen and promote pedigree and performance recording system and feedback mechanism	Ministry responsible for livestock matters	KLBO Universities ILRI AU-IBAR KALRO NGOs Breed organizations Private genetic companies Individuals/Communities/County governments	1 – 5 Years (Phase 1 – 10 Counties)	100M	Ministry responsible for livestock matters Development Partners Foundations Private companies County governments	Functional pedigree and performance recording system Policy briefs
7. Genetic evaluation	strengthen human and infrastructural capacity for genetic	LRC	Universities KALRO ILRI Breed organizations	2 year	35M	Ministry responsible for livestock matters	Qualified and competent human resource

	and genomic evaluation Adapt and promote genomic evaluation/selection procedures Estimate Breeding Values		AU-IBAR Private Livestock genetic companies BecA Ministry responsible for livestock matters			Development partners	Improved infrastructure on genetic evaluation Breeding values Policy briefs
8. Review and assess the impact of existing national policies and legislations on AnGR	Conduct an impact assessment study of the national sector and cross-sector legislation on management of AnGR	Ministry responsible for livestock matters	Universities KALRO Breed organizations Ministry responsible for livestock matters	6 months	3M	Ministry responsible for livestock matters Development partners	Impact assessment report Policy briefs
9. Develop long-term planning and strategic breeding including efforts to improve underutilized breeds	Develop appropriate breeding programmes for locally adapted AnGR	KALRO	Breed societies Farmers Communities Universities NGOs County governments Ministry responsible for livestock matters KAGRC ADC	3 years	500 M	Ministry responsible for livestock matters Development partners KALRO County governments	Appropriate breeding programmes for locally adapted breeds Policy brief
10. Develop approaches to support wide access to, and benefits sharing arising from the use of animal genetic resources and associated traditional knowledge	Support and guide development of community bio-cultural protocols, Intellectual Property Rights and Industrial property rights to facilitate access and benefits sharing	Ministry responsible for livestock matters	County governments Breed organizations NGOs NEMA MENR KIPI CBOs AG National Museum of Kenya	Continuous	10 M	County governments Development partners NGOs County governments	Bio-cultural protocols and ABS legislation for management of breeds Policy briefs

III. Conservation							
11. Community-based conservation programmes	Develop and promote community based conservation programmes for AnGR at risk	Ministry responsible for livestock matters	Departments responsible for livestock matters at the county level NGOs Breed organizations CBOs Livestock keepers Conservationists/conservancy AU-IBAR	5 years	50 M	Ministry responsible for livestock matters Development partners NGOs Conservationists AU-IBAR	Community based conservation programmes Policy briefs
12. Recognition/ award for breeders	Develop and review recognition/ award scheme for livestock breeders to support conservation for AnGR efforts that are at risk	Ministry responsible for livestock matters	County governments Breed organizations NGOs Farmers associations Community representatives AU-IBAR	Annually	5M	Ministry responsible for livestock matters NGOs Farmers AU-IBAR Development partners	Recognition/awards scheme developed Farmers recognized and rewarded Policy briefs
	Support and sustain efforts of conservationists of AnGR	Ministry responsible for livestock matters	County governments Breed organizations NGOs Farmers associations Community representatives	Continuous	10M	Ministry responsible for livestock matters NGOs AU-IBAR Development partners	Sustained conservation efforts Conservation status reports Conservation caucuses Policy briefs
13. *in situ* conservation for animal genetic resources	Develop in situ conservation priorities and goals	Ministry responsible for livestock matters	KALRO CBOs NGOs Breed organizations ADC County governments	Continuous	5M	Ministry responsible for livestock matters AU-IBAR Development partners NGOs County governments	Conservation priorities and goals

	Assess factors leading to the erosion of animal genetic resources and formulate appropriate measures including policy responses	Ministry responsible for livestock matters	KALRO County governments Breed societies NGOs CBOs Genetic material distributors AU-IBAR	2 years	2 M	Ministry responsible for livestock matters Development partners County governments AU-IBAR	Policy briefs Assessment reports Remedies for erosion
14. Strengthen national facilities for *ex situ* conservation	Establish a gene bank with the necessary spatial backups for special animal genetic material	Ministry responsible for livestock matters	KAGRC KALRO ILRI ADC Conservationists/conservancy Farmers CBOs NGOs AU-IBAR Universities Countygovernments	2years	50 M	Ministry responsible for livestock matters Development partners AU-IBAR	A functional gene bank for animal genetic material Conservancies Policy briefs
	Build infrastructural and human capacity for ex-situ conservation of AnGR	Ministry responsible for livestock matters	KAGRC KALRO ILRI ADC AU-IBAR Universities Conservation enthusiasts Custodians of the target AnGR Private livestock genetic dealers	5years	30 M		
	Develop ex situ conservation priorities and goals	Ministry responsible for livestock matters	KALRO CBOs NGOs Breed organizations ADC County governments	2 years	4 M	Ministry responsible for livestock matters Development partners NGOs AU-IBAR	ex situ conservation priorities and goal Policy briefs

	Identify genetic materials for backup	KALRO	Ministry responsible for livestock matters KAGRC National Focal Point ADC	5 years	2 M	KALRO Ministry responsible for livestock matters Development partners AU-IBAR	Materials and locations for backup Policy briefs
15. Develop approaches and technical standards for conservation	Adapt standardized methods and guidelines for use in conservation of AnGR	Ministry responsible for livestock matters	KALRO Universities NGOs Breed societies	2 years	5M	Ministry responsible for livestock matters Development partners	Adapted standardized methods and guidelines for AnGR conservation Policy briefs
IV. Policies, institutions and capacity building							
16. Research, Training and education	Undertake capacity and needs assessment in AnGR management	Egerton University	Ministry responsible for livestock matters KALRO Universities CUE ILRI	1 year	50 M	Ministry responsible for livestock/Fisheries matters Development partners NGOs Au-IBAR	Capacity needs and assessment reports Policy briefs
	Curriculum Review to include AnGR training	Egerton University	Universities Ministry responsible for higher education KALRO ILRI CUE	2 year	10M	Ministry responsible for higher education Universities AU-IBAR	Relevant Curriculum Policy briefs
	Targeted training to build skills at both national and county level in management of AnGR	Ministry responsible for livestock matters	KALRO Universities ILRI AU-IBAR RECs County governments	5 years	65 M	Ministry responsible for livestock matters Development partners County governments AU-IBAR	Competent personnel Policy briefs
	Initiate review of national research priorities in AnGR	KALRO	Ministry responsible for livestock matters County governments CUE	1 year	5 M	Ministry responsible for livestock matters KALRO AU-IBAR	Research priority setting reports Policy briefs

			NGOs NACOSTI Universities				
	Establish networks and platforms for all relevant stakeholders for knowledge and information sharing on sustainable use, development and conservation of AnGR.	National Focal point	Ministry responsible for livestock matters KALRO Universities County Governments Breed societies	Continuous	10M	Ministry responsible for livestock matters Development partners County governments AU-IBAR	Functional networks and platforms Policy briefs
17. Knowledge, Awareness &Stakeholder participation	Review and harmonize existing policies and legal frameworks or and where there are gaps, develop guidelines for the efficient coordination in management of AnGR	Ministry responsible for livestock matters	Breed organizations KALRO KAGRC Universities NGOs CBOs Livestock based professional bodies County governments	5 years	20M	Ministry responsible for livestock matters AU-IBAR Development partners	Relevant Policy and legal frameworks
18. Development and implementation Policies and legal frameworks	Review and development national Standards and protocols on AnGR	Ministry responsible for livestock matters	Breed societies KALRO ILRI KAGRC	Continuous	5M	Ministry responsible for livestock matters AU-IBAR Development Partners	Standards and protocol framework Policy briefs
	Lobby for enactment of livestock and breeding bills	Ministry responsible for livestock matters	Breed Organizations KALRO KAGRC Universities NGOs Livestock based professional bodies	2 Years	20M	Ministry responsible for livestock matters Development partners	Livestock Act Livestock Breeding Act Policy statements

			County governments				
	Review and ensure consistency of national law and policies concerning animal genetic resources with relevant International agreements, as appropriate	Ministry responsible for livestock matters	KALRO Universities Ministry responsible for livestock matters County governments AU-IBAR	2 years	10M	Ministry responsible for livestock matters AU-IBAR Development partners	policies and legal frameworks aligned to international agreements
	Provide appropriate human capacity and budgetary allocations to NFP.	Ministry responsible for livestock matters	National Focal Point Breed Organizations KALRO KAGRC Universities NGOs County governments	Continuous	12M	Ministry responsible for livestock matters Ministry responsible for livestock matters Development partners AU-IBAR	
	Promote regional collaboration in the management of AnGR	National Focal Point	Ministry responsible for livestock matters KALRO AU-IBAR	Continuous	4 M		Functional National Focal Point Policy briefs
19. Strengthen the National Focal Point (NFP) of animal genetic resources	Mobilize resources	Ministry responsible for livestock matters	Breed Organizations KALRO KAGRC Universities NGOs County governments	Continuous	10 M	Ministry responsible for livestock matters AU-IBAR Development partners	Resources availed
	Develop monitoring and evaluation framework for the NSAP	National Focal Point	Ministry responsible for livestock matters KALRO KAGRC Universities NGOs County governments	Continuous	10 M	Ministry responsible for livestock matters AU-IBAR Development partners	Resources availed

6. Progress Evaluation System and Reporting Procedures

Monitoring of the status and trends of animal genetic resources is essential to underpin proposed and agreed national management activities. It will provide all stakeholders with early detailed information on the progress of the ongoing actions for the sustainable utilization of animal genetic resources. Monitoring of the status and trends of the animal genetic resources will be an oversight of the National Strategy and Action Plans implementation stage, and therefore, will determine if the outputs, deliveries and schedules planned have been reached so that action can be taken to correct the deficiencies as quickly as possible. The components of the Monitoring framework include identified national strategic priorities and actions, the evaluation criteria, outputs achieved opportunities and challenges to implementation and future action and are outlined in Table 5.

The framework describes actions for monitoring the status of animal genetic resources within the country. Actions to be taken will include routine assessment to determine whether the desired results and outcomes are achieved and reviewed where necessary. The evaluation criteria will be developed by the National Advisory ommittee, in consultation with each lead agency, to assess performance with respect to each strategic priority for which they are responsible. The national progress report will be prepared annually using the four strategic priority areas of the Strategic Priority Areas of the Global Plan of Action as a framework. An annual synthesis report with recommendations for any adjustments will be generated which will provide a basis on which the National Strategy and Action Plans midterm review will be based. The first national comprehensive review will be done after five years and will contribute to international reporting. The lead agency will report to theNational Advisory Committee which, in turn, reports to Cabinet Secretary responsible for animal genetic resources.

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Annexes

Annex 1. Livestock Population (2016)

No.	Species	Population
1.	Cattle	

		Dairy	4,505,733
		Beef	16,023,458
			20,529,191
2.	Goats		
		Dairy	575,545
		Meat	26,170,371
			26,745,916
3.	Sheep		
		Wool	831,233
		Hair	18,152,527
			18,983,760
4.	Camel		3,222,593
5.	Pig		504,395
6.	Rabbit		824,555
7.	Chicken		
		Indigenous	36,578,441
		Broiler	3,056,747
		Layer	4,161,289
			43,796,477
8.	*Other Poultry		822,181
9.	Donkeys		1,965,632
10.	Ostrich		5,795
11.	Crocodiles		150,200
12.	Guinea Pigs		2,840

*Turkeys, Ducks, Quails, Guinea fowl, Geese, Pigeons and Doves

Annex 2. List of AnGR Species and their breeds

Species	Indigenous breeds	Exotic breed
Cattle	Kenya Boran, NFD Boran, Orma Boran, Turkana, Karapokot, Nandi, Kikuyu, Kamba, Giriama, Duruma, Masaai and Samburu. Winam (Kavirondo), Teso, Watende, Jiddu	Friesian, Ayrshire, Guernsey, Jersey, Belgian blue, Hereford, Charolais, Santa Gertrudis, Aberdeen Angus and Galloways, Sahiwal, Brown Swiss, Red Poll, Simmental and Dexter
Sheep	Red Masaai Sheep, Black head persian sheep	Merino, Corriedale, Sussex, Hampshire, Doper, Romney Marsh, Suffolk, South down
Goat	The East African Goat, Galla(Borana/Somali goat)	Alpine, Torggenburg, Saanen, Anglo Nubian, Angora, Black Bedouin, Oberhosli
Donkey	Somali grey and Maasai brown	-
Pigs	Large white, Hampshire, Landrace	-
Rabbits	Kenyan white	New Zealand white, California white, Chinchilla, Flemish giant, Angora
Camel	Somali, Gabra/Rendille, Turkana	Pakistan Camel
Chicken	Several variants, including unique types such as the Naked neck, frizzle-feathered	Rhode Island Red, Sussex, White and Red Leghorn
Other Poultry Species	Quails, Guinea fowl, Pigeons and Doves	Turkeys, Ducks, Geese
Emerging livestock	Several non-conventional specie that have great potential for food, agriculture and eco-tourism. They include Crocodiles, Ostriches, Guinea fowls, Quails and Zebra	

Annex 3. Members of the National Advisory Committee

No	Name	Institution
1.	Prof. Isaac S. Kosgey	Chairman NAC-AnGR and Laikipia University
2.	Mr. Cleopas Okore	National Coordinator, AnGR and State Department of Livestock
3.	Dr. Samuel M. Mbuku	Kenya Agricultural and Livestock Research Organization
4.	Dr. David Kios	Kenya Animal Genetic Resources Centre
5.	Dr. Muchemi Kariuki	State Department of Veterinary Services
6.	Prof. R.O. Mosi	Jaramogi Oginga Odinga University
7.	Mr. Christopher Chirchir	Kenya Livestock Breeders Organization
8.	Mr. Mohamed Bulle	Agricultural Development Corporation
9.	Dr. William Muhuyi	Kenya Agricultural and Livestock Research Organization
10.	Dr. Camillus Ahuya	Private Sector
11.	Dr. Desterio Nyamongo	Kenya Agricultural and Livestock Research Organization
12.	Dr. Jacob Wanyama	NGO - Life Network
13.	Dr. Douglas Indetie	Eastern Africa Agricultural Productivity Project
14.	Dr. Okeyo Mwai	International Livestock Research Institute

Secretariat

	Name	Institution
1.	Dr. Paul Egesa	Kenya Animal Genetic Resources Centre
2.	Mr. Mwaura Magothe	Livestock Recording Centre
3.	Ms. Judy Gachora	Regional Pastoral Livelihood Resilience Project
4.	Mr. Michael M. Gachukia	State Department of Livestock

Annex 4. Members of the Technical Committee on Animal Genetic Resources

	Name	Institution
1.	Mr. Cleopas Okore	National Coordinator, AnGR and State Department of Livestock
2.	Dr. Samuel M. Mbuku	Kenya Agricultural and Livestock Research Organization
3.	Mr. Thomas M. Magothe	Livestock Recording Centre
4.	Dr. Douglas Indetie	Eastern Africa Agricultural Productivity Project
5.	Mr. Joseph Ngugi	State Department of Livestock
6.	Dr. Paul Egesa	Kenya Animal Genetic Resources Centre
7.	Mr. Kennedy Barasa	Livestock Recording Centre
8.	Dr. Muchemi Kariuki	State Department of Livestock
9.	Mr. Michael Gachukia	State Department of Livestock
10.	Ms. Judy Gachora	State Department of Livestock
11.	Ms. Judith Muricho	State Department of Livestock

Contact us
Ministry of Agriculture and Irrigation
Cathedral Road, Nairobi
P. O. Box 34188-00100 Kenya
E-mail: info@kilimo.go.ke
Telephone: +254-20-2718870
www.kilimo.go.ke